

A new case of Caucasus-Far East disjunctive range in spiders (Araneae)

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Abstract — A new case of Caucaso-Far East disjunction was found in the spiders *Yaginumena maculosa* (Yoshida & Ono 2000), which is known from Caucasus and Japan. Ten other similar ranges in spiders are surveyed. The previously unknown female of *Y. maculosa* is described and the male is redescribed and illustrated.

Key words — Caucasus, Far East, disjunction, spider, Araneae, Theridiidae, *Yaginumena maculosa*

Introduction

Disjunct species ranges have been known in various groups of plants and animals for a long time. They are common among aquatic organisms, cave-dwellers and mountain species. In many cases disjunctions are rather short, although there are few well known cases of long disjunctions, for example, amphi-Eurasian range of the azure-winged magpie, *Cyanopica cyanous* (Pallas); Iberian Peninsula and Far East (Sedlag 1973). In contrast to the vertebrates, trans-Eurasian natural disjunctions at the species level are rather few among terrestrial invertebrates. We were able to trace only two Caucaso-Far Eastern disjunctions among sawflies, *Arge rustica* (Linnaeus 1758) (Ermolenko 1972), and terrestrial mollusks (*Gastrocopta theeli* (Westerlund 1877), L. A. Prozorova pers. communication).

On the other hand, the number of cases of the Caucaso (or Euro) -Far East disjunctions are remarkably high in spiders, not less than ten species (Logunov & Marusik 1990; Marusik & Guseinov 2003).

During a recent trip made by two of the authors (YM & EG) to Lenkoran in South Azerbaijan, YM and EG found several specimens belonging to an uncertain species of Euryopini-Dipoenini. These specimens have copulatory organs and markings different from all the species of *Euryopis s. lato* and *Dipoena s. lato* from Europe and the Near East. An extensive literature search enabled YM and FG to identify this species to *Yaginumena maculosa* (Yoshida & Ono 2000) which was originally described under the genus *Dipoena*, and one of the authors (HY) also confirmed the

identification. This species has been known by males alone. We, therefore, decided to provide an illustrated description of both sexes and a survey of all the species with Caucaso-Far East disjunctive distribution.

Material and methods

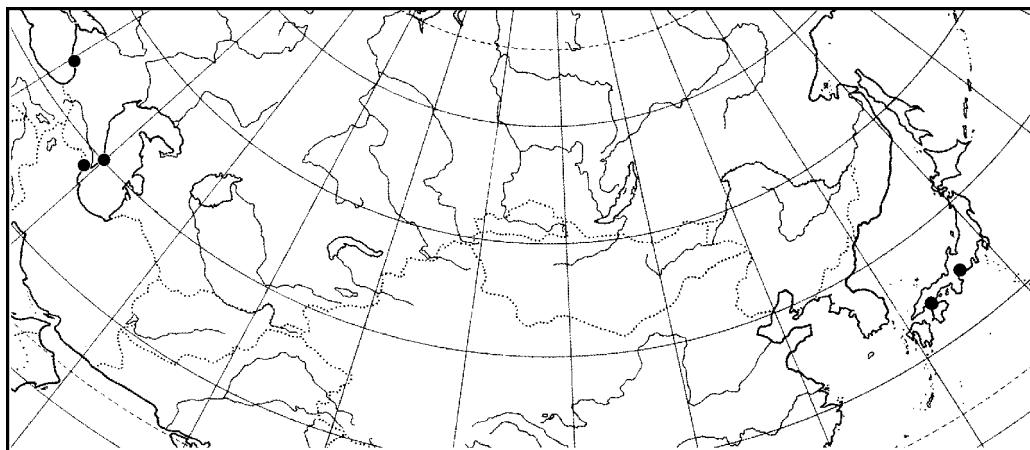
Material treated herein is deposited in Zoological Museum, University of Turku (ZMUT), Yu. M. Marusik temporary collection in Turku (YMT), Zoological Museum of the Moscow State University (ZMMU), Department of Zoology, National Science Museum, Tokyo (NSMT) and H. Yoshida personal collection (HYC).

All measurements are given in mm. Microphotographs were made with a JEOL JSM-5200 SEM in the Zoological Museum, University of Turku.

“Yaginumena” maculosa (Yoshida & Ono 2000)
Figs. 1–12, Map 1

Dipoena maculosa Yoshida & Ono 2000, p. 147, f. 37–39 (♂).
Yaginumena maculosa: Yoshida 2002, p. 13, f. 2 (♂); Yoshida 2003, p. 169, f. 462–465, 593 (♂).

Material examined. AZERBAIJAN: 4♂ 5♀ (ZMUT, YMT & HYC), Lenkoran Dist., environs of Aurora Vill., 38°41'N 48°17'E, 36 m, 21–29.05.2003 (Yu. M. Marusik); 1♀ (ZMMU), SE Azerbaijan, Lenkoran area, Hyrkan Reserve, 38°38.5'N 48°47.5'E, 23.05.2003 (Yu. M. Marusik); 2♀, CE Apsheron Peninsula, env. of Baku, Mardakyan, dendarium, 40°29.26'N 50°09.6'E, 14.05.1994 (E. F. Guseinov); 2♂ 1♀ (ZMMU), same



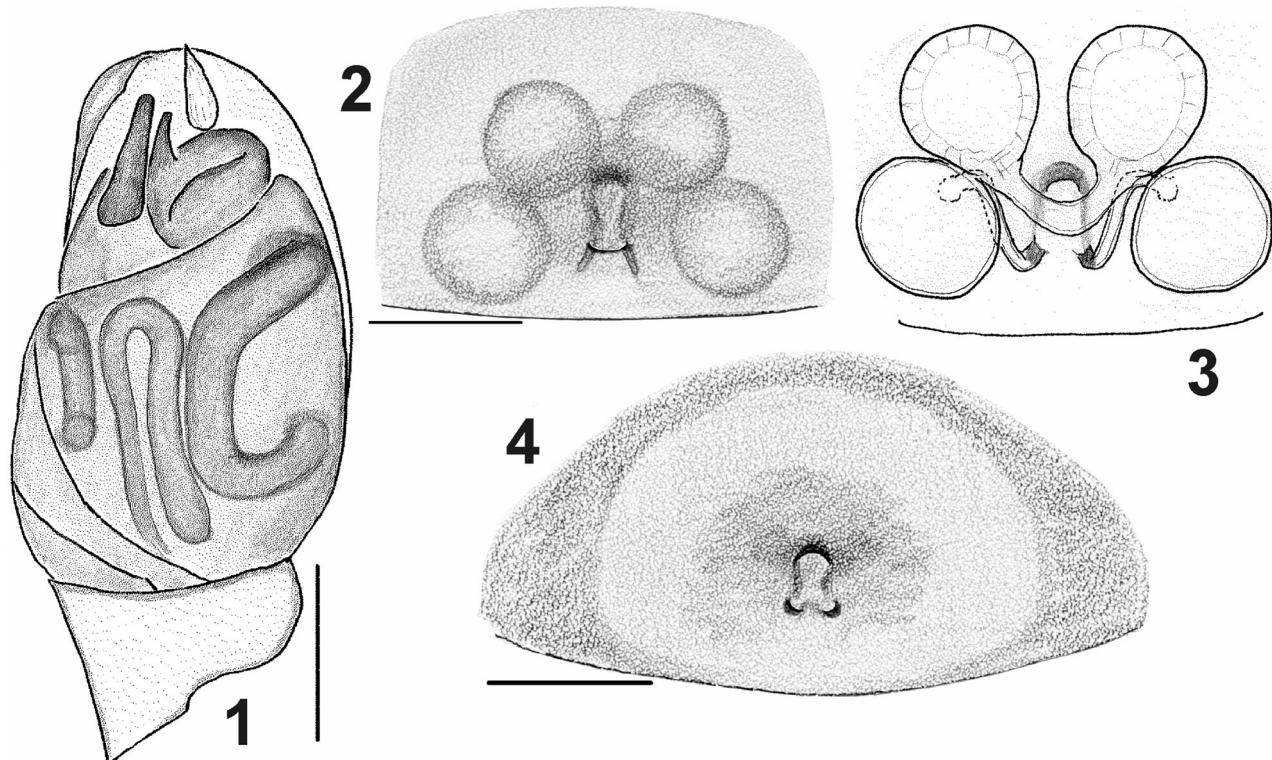
Map 1. Distribution of *Yaginumena maculosa* (Yoshida & Ono 2000).

locality, 27.06.1996 (E. F. Guseinov). ABKHAZIA: subadult 1 ♂ (YMT), env. of Pitsunda Town, Ldzaa Vill., copse 2–3 m *Pinus pityusa* along seashore, litter, 43°10.255'N 40°22.370'E, 16.10.2004 (Yu.M. Marusik). JAPAN: 1♂ (YMT), Honshu, Aichi Pref., Nagoya-shi, Midori-ku, Otaka-ryokuchi-koen, 27.05.2001 (K. Ogata); 1♂ (holotype, NSMT-Ar 4506), Honshu, Okayama Pref., Tamano-shi, Numa, 01.07.1997 (K. Nojima).

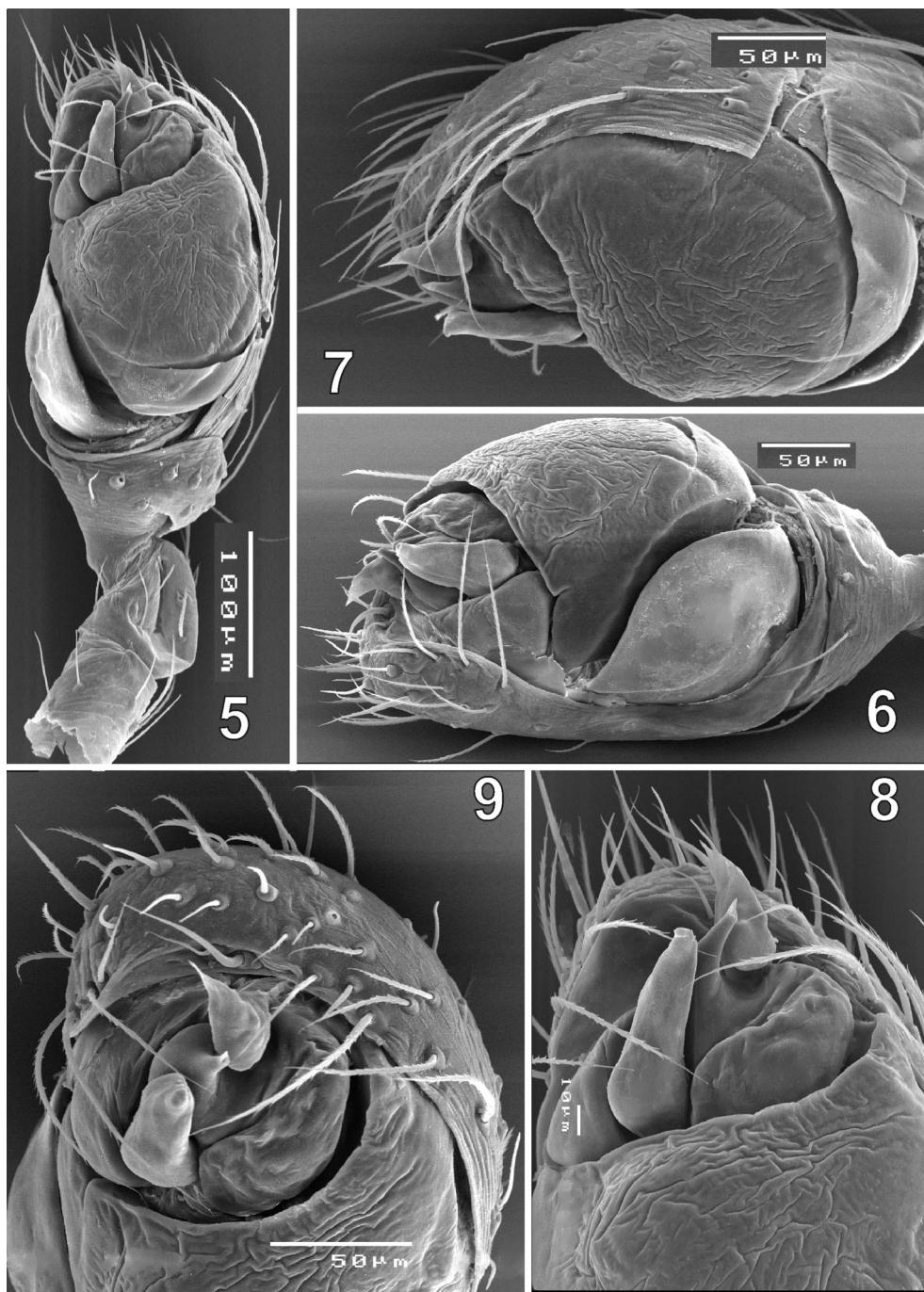
Description. Male. Total length 1.43. Carapace: 0.64 long, 0.53 wide, yellowish gray with raised cephalic area and with grey trident pattern. Sternum, labium, maxillae and chelicerae grayish-yellow. Legs uniformly yellow.

Abdomen dark grey with small yellow spots dorsally and laterally, median half with thin pale stripe. Abdominal pattern poorly distinct in some specimens. Booklungs and spinnerets yellow. Palp as shown in Figs. 1, 5–8, with three distinct outgrowths: finger-like median apophysis, conical, slightly turned embolus, and transparent, leaf-like conductor; upper edge of the cymbium with one strong seta. Leg joint length as in Table 1.

Female. Total length 1.90. Carapace: 0.80 long, 0.66 wide. Coloration similar to that of male, but both carapace and abdomen paler and median stripe and spots on dorsum



Figs. 1–4. Copulatory organs of *Yaginumena maculosa* (Yoshida & Ono 2000), specimens from Lenkoran (1–2) and Absheron Peninsula (3–4)—1, male palp, ventral view; 2, 4, epigyne, ventral view; 3, female internal genitalia, dorsal view. Scales: 0.1 mm.



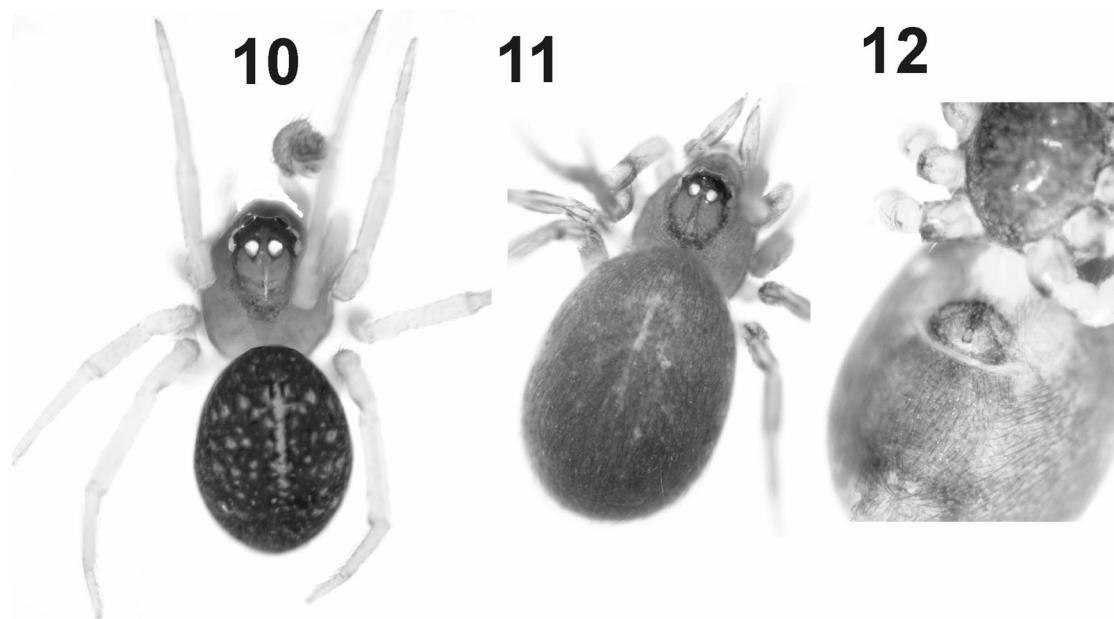
Figs. 5–9. SEM microphotographs of the male palp of *Yaginumena maculosa* (Yoshida & Ono 2000), specimen from Lenkoran—5–7, ventral, prolateral and retralateral view, respectively; 8–9, terminal part of the palp, ventral and apical view, respectively.

Table 1. Leg joint length (δ , in mm)

Leg	Femur	Patella	Tibia	Metatarsus	Tarsus	Total
I	0.67	0.24	0.44	0.43	0.36	2.14
IV	0.64	0.26	0.47	0.41	0.31	2.09

Table 2. Leg joint length (φ , in mm)

Leg	Femur	Patella	Tibia	Metatarsus	Tarsus	Total
I	0.77	0.33	0.50	0.53	0.37	2.50
IV	0.93	0.36	0.59	0.61	0.41	2.90



Figs. 10–12. Body of *Yaginumena maculosa* (Yoshida & Ono 2000)— 10, male, dorsal view; 11–12, female, dorsal and ventral view, respectively (12, shows epigyne).

less pronounced. Epigyne as shown in Figs. 3–4, with 4 distinct or not clearly distinct receptacula, fovea and opening are poorly visible and slightly variable in shape. Basal and apical receptacula of about the same size. Leg joint length as in Table 2.

Distribution. Honshu (Okayama and Aichi Prefectures), Japan; southeast Azerbaijan and Abkhazia, Caucasus.

Comments. Yoshida (2003) suggested that “*Dipoena* sp.” from Orchid Island, Taiwan (Yoshida et al. 2000) might be conspecific with this species. However, there is a considerable morphological gap in both epigynum and female internal genitalia between the “*Dipoena* sp.” and the present female specimens of *Yaginumena maculosa* from Azerbaijan; suggesting they are not conspecific.

This species was first described in *Dipoena* and later transferred to a new genus *Yaginumena* Yoshida 2002 (type species: *Dipoena castrata* Bösenberg & Strand 1906). A comparison of copulatory organs of *Y. maculosa* and the generotype, revealed that these species are not closely related and possibly not congeneric. As well as differences of the copulatory organs, *Y. maculosa* has a very peculiar abdominal pattern in comparison to *Y. castrata*, and *Y. mutilata* (Bösenberg & Strand 1906), a third member of the genus.

Besides Lenkoran, this species was collected on Apsheron Peninsula. Although the Apsheron Peninsula lies in the semidesert zone of Azerbaijan, all specimens were collected in an arboretum with artificial watering and therefore much more moist climate. It is very probably that this species was introduced to Apsheron from the Lenkoran area, many plants were brought to arboretum.

Discussion

As was said in the introduction, at least ten other species of spiders have a Caucaso-Far Eastern or an Euro-Far Eastern disjunctive ranges. They are listed in Table 3.

It is worth mentioning that one more species for a certain time was treated as Caucaso-Far Eastern. It was *Ozyptila balkarica* Ovtsharenko 1979. It was known from Caucasus Major, northeastern Siberia and Sakhalin (Ono et al. 1990). Later this species was synonymised with *O. orientalis* Kulczyński 1926 known from Kamchatka, and found in the Urals and south Siberia (Marusik et al. 2000).

Two species, *Larinia eskovi* Marusik 1986 and *Sitticus saxicola* (C. L. Koch 1848) have disjunctions between Europe and Far East, but not penetrating Caucasus. The former species is known from Hungary and Poland in Europe (Szinetár & Eichardt 2004) and in the Far East in Asia (Marusik 1986; Tanikawa 1989). The latter species is known only from central Europe and Sakhalin (Logunov & Marusik 2000; Kronestedt & Logunov 2001).

For about two decades three more salticid spiders, *Euophrys frontalis* (Walckenaer 1802), *Pseudeuophrys erratica* (Walckenaer 1825), *Sitticus caricis* (Westring 1861) were thought to have Euro-Far Eastern disjunctive ranges, but investigation of the Siberian fauna revealed that these species have Euro-Yenisei-Far Eastern range, and have disjunctions just between Yenisei and the Far East (Logunov & Marusik 2000).

Of 11 species with wide disjunctions between West and East Palaearctic nine occur in Caucasus. Of these, six are not known in Western Palaearctic outside of Caucasus. They have purely Caucaso-Far Eastern ranges. Among

Table 3. Spiders with disjunctive Euro- or Caucaso-Far East ranges and their distribution (•).

Family	Species	Area ¹⁾				References ²⁾
		EURO	CAUC	F. E.	EX. PAL	
Caucasus-Far East disjunction						
Nesticidae	<i>Howaia mogera</i> (Yaginuma 1972)		•	•	•	1
Araneidae	<i>Larinia bonneti</i> Spasski 1939	•	•	•		2, 3
Salticidae	<i>Myrmarachne formicaria</i> (De Geer 1778)	•	•	•		4
Uloboridae	<i>Octonoba yesoensis</i> (Saito 1934)		•	•		5
Salticidae	<i>Phintella castrisiana</i> (Grube 1861)	•	•	•		4
Theridiidae	<i>Rhomphaea hyrcana</i> (Logunov & Marusik 1991)	•		•	•	6
Theridiidae	<i>Rhomphaea sagana</i> (Dönnitz & Strand 1906)	•		•		7
Thomisidae	<i>Tmarus horvathi</i> Kulczyński 1895	•		•		7
Theridiidae	<i>Yaginumena maculosa</i> (Yoshida & Ono 2000)	•		•		PS
Europe-Far East disjunction						
Salticidae	<i>Sitticus saxicola</i> (C.L. Koch 1846)	•		•		8
Araneidae	<i>Larinia eskovi</i> Marusik 1986	•		•		9

¹⁾ EURO=Europe, CAUC=Caucasus, F. E.=Far East, EX. PAL=ex. Palaearctic²⁾ 1=Marusik & Guseinov 2003, 2=Marusik 1986, 3=Tanikawa 2000, 4=Prószyński 1976, 5=Marusik 1987, 6=Yoshida 2001, 7=Logunov & Marusik 1990, 8=Logunov & Marusik 2000, 9=Kupryjanowicz 1995, PS=present study

these six species, three were found only in Lenkoran (SE Azerbaijan), and two more in Eastern Georgia+Lenkoran. This indicates the importance of further investigation of fauna in Lenkoran Area of Azerbaijan and in adjacent Iran. All species which have unusual ranges and occur in Lenkoran, except for *Myrmarachne formicaria* (De Geer 1778), are restricted to relic so-called "Hyrcan forest" habitats, such as trees and bushes at the forest openings, litter in forest and surrounding habitats, and shaded stony debris.

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